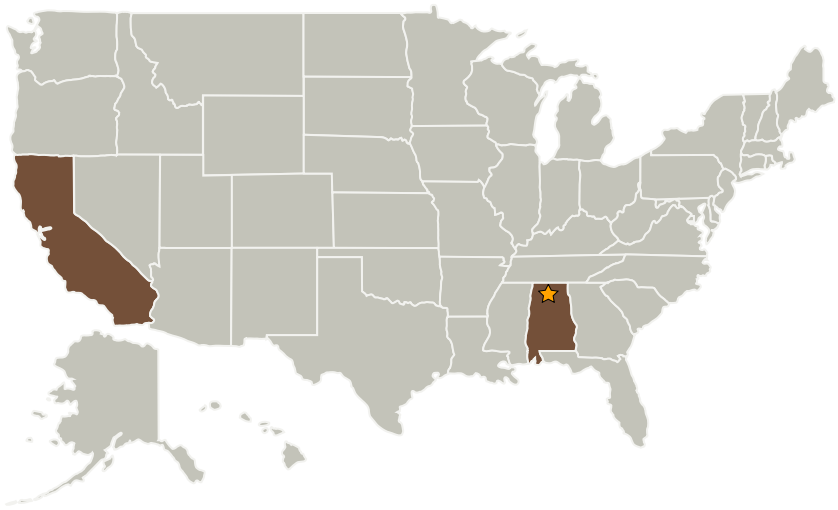
Holographic Optical Element-Based Laser Diode Source, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

NASA is seeking improved methods of rapid prototyping, which are best achieved by using directed metal deposition (DMD). Current DMD systems consume a great deal of power, are inefficient, require significant flow of cooling water, and are fixed in one location. To address the need for a rapid prototyping DMD laser, Physical Optics Corporation (POC) proposes to develop a new holographic optical element-based laser diode source (HOELDS) to replace conventional DMD lasers. The proposed laser source is an innovative combination of extended laser diode arrays with a non-imaging beam combiner to produce over 500 W output in a 100 micron diameter spot. HOELDS will greatly increase efficiency, resulting in a less expensive prototyping system that can be moved from laboratory to laboratory as needed, requiring only wall plug power, and cooled without water. In Phase I, POC will design, assemble, and test a HOELDS model to demonstrate the feasibility of the proposed technology. In Phase II, HOELDS technology will be optimized to produce a prototype DMD laser for evaluation in an engineering environment. This project will be followed by a smooth transition to a commercial prototype that will be compact, power-efficient, and portable.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Physical Optics Corporation	Supporting Organization	Industry	Torrance, California

Primary U.S. Work Locations	
Alabama	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Russell Kurtz

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers